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10/766,103	01/27/2004	Willie W. Ng	B-4585 619759-6	2200

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EXAMINER

VAN ROY, TOD THOMAS

ART UNIT	PAPER NUMBER
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2828

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PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No. 10/766,103	Applicant(s) NG ET AL.	
	Examiner TOD T. VAN ROY	Art Unit 2828	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 17 December 2007.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1,3-17 and 19-39 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1,3-17, 19-23, 26 and 29-39 is/are rejected.
- 7) ☒ Claim(s) 24, 25, 27, 28 and 30 is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on _____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application |
| Paper No(s)/Mail Date <u>08/24/07</u> . | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Response to Amendment

The Examiner acknowledges the addition of claims 31-39 as well as the amending of claims 17 and 29.

Response to Arguments

Applicant's arguments filed 12/17/2007 have been fully considered but they are not persuasive.

The Applicant has stated the gain material cannot be on the integration platform of Orenstein if the waveguides are on the platform, or vice versa.

The integration platform of Orenstein can be interpreted as being the substrate as well as the burying materials on top of the substrate and surrounding the waveguides. Therefor, the gain material is on the platform (substrate portion) while the waveguides are in the platform (buried portion).

The Applicant has asked for verification of the passive WG location which is meant to read on the first optical path limitation.

The passive WG seen on the bottom of fig.5d (top down view) is considered to be the first optical path, while the 1.3 layer seen on the top of fig.5d (top down view) is considered to be the second optical path.

The Applicant questions the combination of Orenstein and Yamada.

The Examiner notes that Orenstein presents a gain medium containing optical device comprising both substrate and waveguides made of various materials. Yamada presents a gain medium containing optical device wherein silicon waveguides and

substrates are utilized. Yamada further teaches that the silicon material presents an advantage for heat dissipation in the substrate, and it is well known that silicon materials function well as waveguides for a wide range of frequencies. Therefore, it is deemed obvious to combine the device of Orenstein with the silicon materials of Yamada to improve the heat dissipation as well as to allow for use of a wide frequency waveguide material which would work well with the tunable wavelength ability of Orenstein. The Examiner further makes note of the references listed in the previous office action relating to the integration of InP and Si based materials.

The Applicant states that Orenstein uses a grating generating only a single transmission peak (application to claim 10).

The Examiner points to fig.3a of Orenstein wherein a grating is taught to be usable in place of one microring or vice versa. Additionally Orenstein states at col.3 lines 43-54 that this device is similar to the prior art previously discussed (noting the passages of columns 1-2 the Applicant has cited in the Remarks) and that this grating is in fact of SGDBR or SSGDBR types. Orenstein states that the prior art used two of these grating types, and that he intends to replace one or both of them with the microring. The Examiner concedes that Orenstein appears to be most concerned with utilizing the microrings exclusively, but that does not change the fact the this grating type is still used as one of the embodiment options. This grating type is demonstrated to be used, and is known to generate multiple reflection peaks.

The Applicant has stated that the limitations of claim 29 have not properly been addressed regarding the III-V type Fabry-Perot tunable etalon.

The combination of the microring and the grating each function as a mirror-type feedback device which acts to form a Fabry-Perot type etalon cavity. This cavity is tunable (via the microring) as is created of III-V materials (InP).

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

Claims 1, 5-10, 13-16, and 31-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Orenstein et al. (US 6940878) in view of Yamada et al. (US 6027254).

With respect to claim 1, Orenstein teaches (fig.3a,5d), a reconfigurable laser transmitter comprising: an integration platform having a substrate (fig.3a), a gain element (col.3 lines 36-37) having an optical output, the gain element having a body of material different from said integrating platform (active layer would inherently be a

different body of material in order to lase), being disposed on said integration platform, a first optical path (fig.3a laser WG, fig.5d passive WG 1.14) receiving optical output from said gain element, said first optical path comprising a waveguide (laser WG, passive WG) within said integration platform, a tunable microresonator (fig.3a A, fig.5d ring) optically coupled with said first optical path, a second optical path coupled with said tunable microresonator, said second optical path comprising a waveguide (fig.3a upper, fig.5d 1.3 layer), and a fixed grating (fig.3a B, alternate additional ring used in fig.5d) in said integration platform (col.5 lines 4-5, on waveguide so in platform) and coupled with said second optical path. Orenstein does not teach the waveguides and substrate to be of silicon material. Yamada teaches a gain medium integrated onto a silicon substrate and using silicon waveguides (fig.9). It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the substrate and waveguide material of Yamada with the transmitter of Orenstein in order to allow for heat dissipation through the substrate (Yamada, col.1 lines 40-52), as well as to use silicon waveguides for the guiding (non-doped guides) as this well known waveguiding material (optical fibers) is a low loss transmitter of a plurality of wavelengths which would function well in Orenstein's tunable system.

References noted, but not relied upon, that teach the use of InP based materials in conjunction with silicon substrates, waveguides, and active (doped) mediums are: US 2005/0147355, 2004/0208413, 2004/0114869, 2004/0081393, and 2003/0034538.

With respect to claim 5, silicon inherently has a temperature sensitivity of less than 0.1A/C (approx. 0.01 A/C, see Conradi US 6061369).

With respect to claims 6-7, Orenstein teaches electrical (Vernier) tuning (col.3 lines 60-63).

With respect to claim 8, Orenstein teaches the use of a sampled grating (col.3 lines 45-48).

With respect to claim 9, Orenstein teaches the gain element is a laser and the grating is used for locking the laser thereto (col.1 lines 31-37).

With respect to claim 10, Orenstein and Yamada teach the transmitter as outlined in the rejection of claims 1 and 9 above, and Orenstein additionally teaches the microresonator is mounted on the integration platform.

With respect to the UV-induced limitation found in claim 10, these limitations merely detail the methods of forming the device. The method of forming a device is not germane to the patentability of the device itself, therefore these limitations are not given patentable weight. At best these claims could be characterized as product-by-process claims, where the process limitations are not limiting, only the structure implied by the process. See MPEP 2113. Here, the structure implied by the process steps is merely the structure of claim 10.

Claims 13-16 are rejected for the same reasons outlined in the rejections to claims 6, 5, 8, and 7 respectively.

With respect to claim 31, the grating of Orenstein provides multiple reflection peaks, and the microresonator is tuned in order to align its reflection passband spectrum with a peak to select a desired wavelength (please see Response to Arguments above).

With respect to claim 32, Orenstein teaches the gain element to be a semiconductor amplifier (fig.5d the laser WG layer is the gain element, is of InP, and provides optical amplification).

Claims 3 and 11 are rejected under 35 U.S.C. 103(a) as being unpatentable over Orenstein, Yamada, and further in view of Soref (US 6195187).

With respect to claims 3 and 11, Orenstein and Yamada teach the transmitter outlined in the rejections to claims 1 and 10 below, but do not teach the use of a microdisk. Soref teaches a coupling device (between two waveguides) which uses a microdisk. It would have been obvious to one of ordinary skill in the art at the time of the invention to replace the microring of Orenstein and Yamada with the microdisk of Soref in order to obtain a more favorable contact geometry (Soref, col.5 lines 60-64).

Claims 17, 19-23 and 26 are rejected under 35 U.S.C. 103(a) as being unpatentable over Orenstein, Yamada, Soref, and further in view of Tanaka et al. (US 6320888).

With respect to claim 17, Orenstein, Yamada, and Soref teach the transmitter outlined in the rejections to claims 1, 3, and 6 above, but do not teach the grating to be formed in the waveguide. Tanaka teaches a gain medium and silicon waveguide integrated on a silicon substrate (fig.1) wherein the grating is written directly unto the waveguide. It would have been obvious to one of ordinary skill in the art at the time of the invention to combine the transmitter and separated waveguide/grating of Orenstein,

Yamada, and Soref with the combined waveguide/grating of Tanaka in order to reduce the amount of loss due to evanescent coupling when using an external grating.

Claim 19 is rejected for the same reasons as claim 7 above.

Claim 20 is rejected for the same reasons as claim 9 above.

With respect to the UV-induced limitation found in claim 21, these limitations merely detail the methods of forming the device. The method of forming a device is not germane to the patentability of the device itself, therefore these limitations are not given patentable weight. At best these claims could be characterized as product-by-process claims, where the process limitations are not limiting, only the structure implied by the process. See MPEP 2113. Here, the structure implied by the process steps is merely the structure of claim 17.

With respect to claim 22, Orenstein further teaches the step of coupling a fixed optical resonator filter (B) to said tunable microresonator (A) (see figs.4a/b).

With respect to claim 23, Orenstein further teaches emitting light at 1.55um (col.3 lines 29-42, an international standard for silicon waveguides (fibers)).

With respect to claim 26, Orenstein further teaches forming another waveguide in the integration platform (either WG or upper). Orenstein does not teach the microresonator to be of III-V materials. These materials are known in the art to be used with semiconductor lasers and resonators. It would have been obvious to one having ordinary skill in the art at the time the invention was made to make the resonator of these known materials, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended use as

a matter of obvious design choice. *In re Leshin*, 227 F.2d 197, 125 USPQ 416 (CCPA 1960).

Claims 29 and 33 are rejected for the same reasons outlined in the rejection to claims 1 and 17 above.

Claims 34-39 are rejected for the same reasons outlined in the rejection to claim 31-32 above.

Allowable Subject Matter

Claims 24-25, 27-28 and 30 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

Conclusion

Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the

shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to TOD T. VAN ROY whose telephone number is (571)272-8447. The examiner can normally be reached on M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Minsun Harvey can be reached on (571)272-1835. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/TVR/

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/Minsun Harvey/

Supervisory Patent Examiner, Art Unit 2828